Chapter 7

Evaluation of Response Reliability

Introduction

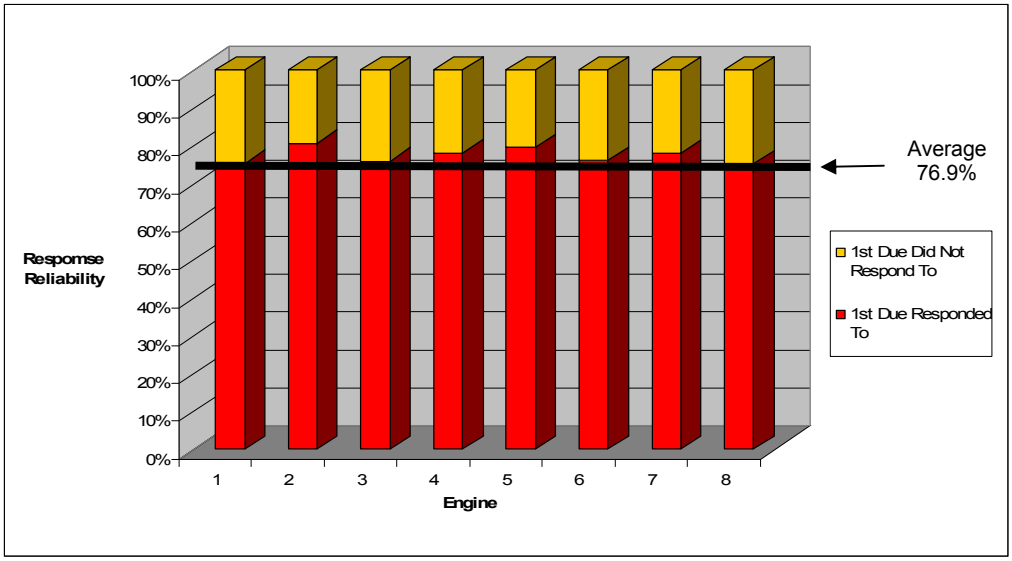
Response reliability is the probability that the resources assigned to a territory will be available to respond from within that territory when an emergency occurs in that area. Response reliability would be 100 percent if every company were available in its station when a fire or emergency call is received. In reality, there are times a call is received when the first-due company is out of area or unavailable. This requires that a later-due company, in the pre-determined response order, be assigned the response. If the later-due company is too far away, the call cannot be handled within the desired total reflex time.

As the number of emergency calls per day, training demands, and other routine activities (such as taking apparatus to the repair shop) increase, so does the probability that the first-due company will be out of area or unavailable when a call is received (decreased reliability).

Constraints in the existing Computer Aided Dispatch (CAD) system limit the ability of the LF&EMS to easily isolate and analyze which calls could not be handled by the assigned first-due company. To present the total picture, we have analyzed the number of calls that were *not* handled by the first due company.[1] Data covering FY02 through FY04 are included to compare reliability rates of units.

[1] A call might be handled by other than the first due company when the other company was "passing through" the area, relocated for training, or for a variety of other reasons.

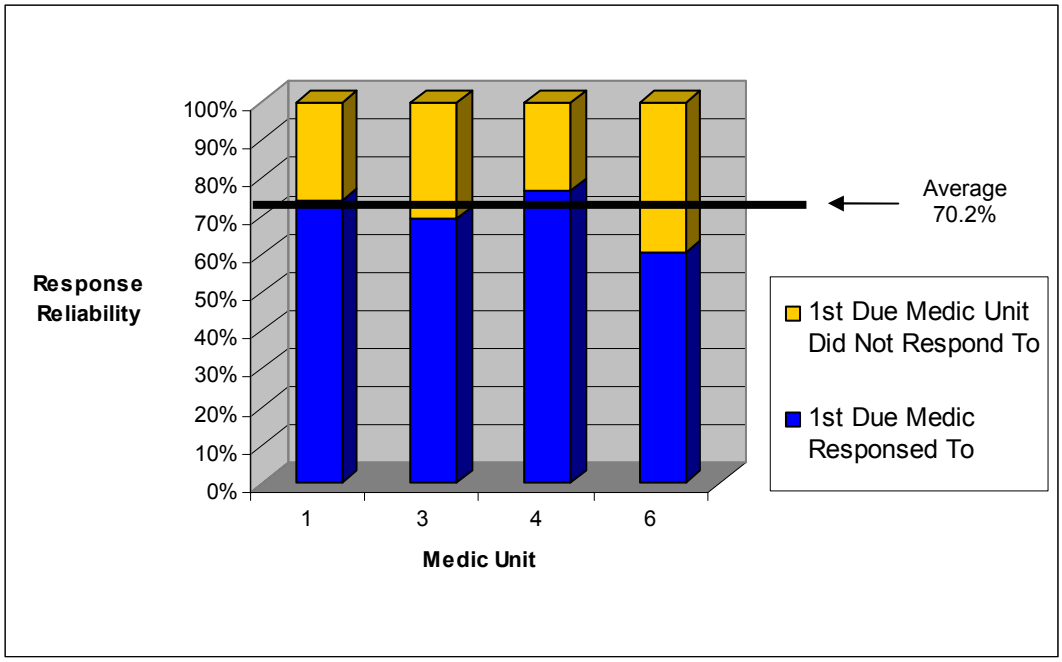
Figure 7.1 **Analysis of Response Reliability By First Due Engine: 2004-2004**



As shown in the above graph, four of the eight engines fall below the average response reliability of 76.9 percent. Engines 1 and 6 has a lower than average response reliability for several reasons, but primarily because these are the engines that are placed out of service when staffing levels fall below minimums. Additionally, when Engine 6 is out of service it misses a greater number of calls than do other engines when they are out of service. However, the concentration of engine resources around Station 6 provides for coverage. Additionally, with Engine 6's high call volume, there is a greater possibility of multiple calls being received at concurrent times. Engines 3 and 8 also have low response reliabilities, which is evidence of the ever-increasing call volume as a result of development within Engine 3 and 8's service areas. With the higher call volume, there is the higher probability that Engine 3 and 8 will already be on another call.

The actual response reliability for each engine company and each response zone is included in the attachments section of this document.

Figure 7.2 **Analysis of Response Reliability By First Due Medic Unit: 2002-2004**



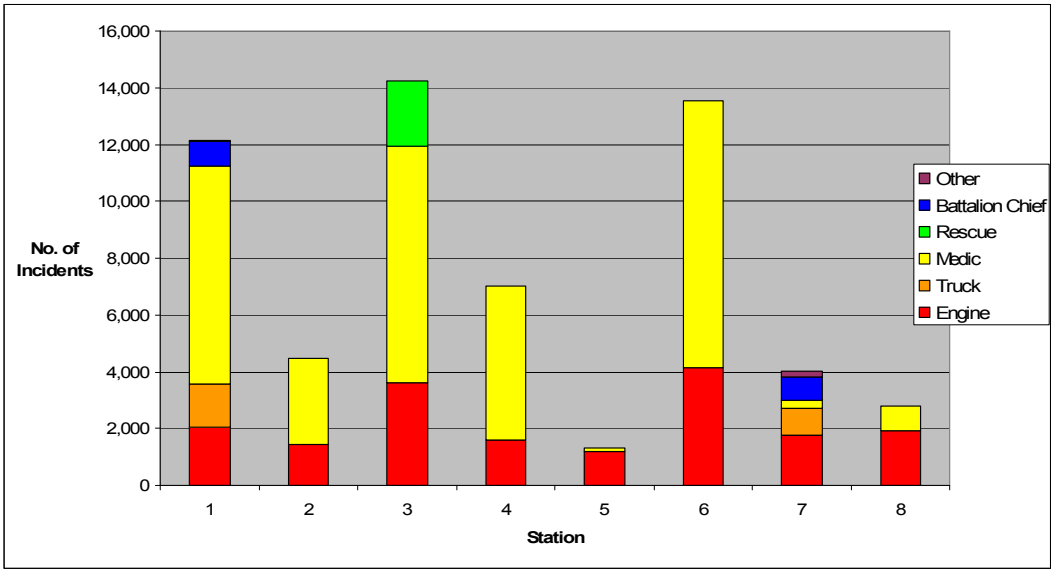
As shown in the graph above, the average response reliability for the four emergency medic units assigned to 24-hour shifts is 70.2 percent. Two medic units, Medic 3 and Medic 6 fall below the average. The actual response reliability percentage is inversely proportional to the call volume for each of the medic units (i.e. Medic 6 has the highest call volume, but has the lowest response reliability). Medic 4 has the highest response reliability at 76.8 percent, followed by Medic 1 with 74 percent. Medic 3 has a response reliability of 69.4 percent and Medic 6's response reliability is 60.6 percent.

The actual response reliability for each medic unit and for each response zone is included in the attachments section of this document.

Company Workload

The following chart illustrates the annual distribution of calls by type of apparatus by station. This chart shows the stations with the most calls, as well as those with multiple pieces of response apparatus. This information, coupled with response reliability data, lets LF&EMS further analyze resources distribution and workload issues.

Figure 7.3 **Run Distribution By Type of Apparatus: 2002-2004**



As seen in the above three (3) year figures, the three busiest stations are Station 3, Station 6, and Station 1. Station 1 responded to approximately 12,200 calls for service in 2002 to 2004 (4,052 per annum) when combining all six pieces of apparatus assigned to the station. Station 3 responded to 14,223 calls for service in 2002 to 2004 (4,741 per annum) when combining all three pieces of apparatus assigned to the station. However, Station 6 responded to just over 13,500 calls for service in 2002 to 2004 (4,514 per annum) when combining the engine company and medic unit assigned to the station. Activities beyond an average of 3,000 calls per year usually show significant impact on response times, company availability and fire fighter fatigue.

Stations 3 and 6 continue to be the busiest stations within LF&EMS. While Station 6 has a large call volume within its own first-due response areas, its central location makes it second-due in many other areas and the units assigned there often respond to calls for service in other response areas when the first-due units are unavailable.

Some companies exhibitied a low run volume, including 2, 4 and 5. However, these stations are located in highly residential areas and have historically low call volumes. Stations are needed in these areas to ensure quick response during all

times of the day, although there is some significant overlap in travel time capabilities in Station 2 and 4's response areas by Stations 1 and 6.

Performance Measurement and Quality Assurance

By its very nature, the organized response to emergencies is performed in a stressful and inherently unpredictable environment. Critical decisions must often be made quickly, without the benefit of a methodical risk-benefit analysis. Given this, it is expected that errors will sometimes occur. LF&EMS consistently seeks to use its performance measures as opportunities to learn how we can improve our service and to adjust our policies and procedures accordingly.

Fire Suppression and Rescue Operations

An integral component of quality assurance is the use of post-incident evaluations by the department. Conducted at the discretion of the shift Battalion Chiefs, these are focused reviews following major incidents, and for any incident involving fatalities or a serious injury, a unique operational situation, or a multi-agency response. They involve all responding personnel as well as the leaders from the affected organization(s). Less serious, routine incidents and events are also sometimes evaluated at the company level. Post-incident evaluations consider the following criteria:

1. System strengths or weaknesses
2. Factors driving operational decisions
3. Standard Operating Procedures
4. Apparatus and equipment effectiveness
5. Education and/or training needs
6. Building construction factors
7. Unusual circumstances
8. Human factors that contributed to the problem

Emergency Medical Services

A quality assurance program, of sorts, has been in place for a number of years for the analysis of the emergency medical services provided by the department. It is the practice of LF&EMS to regularly participate in activities that lead to the development and maintenance of establish levels of high quality patient care and customer service, as well as activities that seek to improve the overall level of care.

Each patient care report is reviewed by "chart reviewing" Captains or Master Firefighters on each shift. The majority of their work consists of ensuring the report is complete in terms of required elements. However, these reviewers also may question providers on the procedures performed/not performed during the call for service. Further action can be taken by referring providers or charts in question to the EMS Training Captain or the EMS Battalion Chief for further review.

Another significant form of quality assurance is the now annual EMS skills review for all EMS providers. Providers are monitored during skills review sessions in the late winter.

LF&EMS is anticipating the implementation of a "formal" quality assurance program under the direction of a Quality Assurance Captain. This position was included in the FY2006 budget and will be filled in January 2006.

Chapter 8

Policy Recommendations

Future Needs, Recommendations and Service Improvement

Every quality organization must engage in continuous self-examination and must seize opportunities for improvement as they are identified. LF&EMS has identified several opportunities for improvement as a result of the CFAI accreditation process and the development of this Standard of Response Coverage document, which include the following:

1. Use this document and Lynchburg 2015 document to **continue a comprehensive environmental analysis** of the projected demands that will be placed on the organization by continued growth, greater density, shifting demographics, and other risks in the future.
2. Work with the City's policy makers to **ensure that Lynchburg maintains a fire fighting/emergency medical force adequately matched to the identified risks, hazards, and demands** of the community.
3. **Establish training programs for all personnel**, with an emphasis on company officers, to review, evaluate and discuss information tracking, use of communications/electronic equipment, computer program interface, and educate them about the link between data, response coverage and deployment decisions.
4. **Enhance the uses of the fire and EMS data reporting systems** to collect more detailed information on unit operational performance. For example, LF&EMS knows how many incidents a unit was dispatched on and arrived on the scene, but not how often the units performed a specific task – such as how often an aerial device actually deployed a master stream.
5. **Enhance and use the "Premise" module on the Visual Fire Info reporting system** to allow for the collection and analysis of more detailed information about buildings in the city. This analysis will serve as a basis for considering whether more closely defined *risk zones* or *demand zones* are necessary for operational planning, or if current *response zones* are effective. Additionally, provide occupancy information, such as suppression systems, and other key risk elements as identified in the RHAVE program.

6. **Maintain the regular revision of the Facilities Plan** to help budget, prioritize capital needs, and forecast. There could also be an effort by the city to review each department's facility plan to determine if there are possible cross-functional purposes that new buildings could be utilized for – such as police sub-stations, recreational facilities, or outposts for other city services that are otherwise located in a single-location, like city hall.
7. **Incorporate recommendations highlighted in this document into the department's strategic plan** as goals, strategies or performance measures, where bother financially and operationally feasible.
8. **Expand data analysis capabilities and project deployment needs** through computer applications and models.
9. **Address the issue of exception reporting** and facilitate developing a mechanism in the reporting software so companies can select from a pre-defined drop down list. This will enable the department to more accurately assess response time performance when companies face circumstances that cause a delay or cause a first-due unit to not be the first-due unit to arrive or be dispatched.
10. Establish a process to record *productivity reports* in order to **perform analysis and produce comprehensive reports on resource "true" availability and utilization** at the company level. With this, a measure of true *"out of service"* times will be readily available.
11. Research information on the various methods of delivering training programs to the companies to **reduce the amount of time that units are out of the first-due response zones for training.**
12. Perform improvements in **determining hazardous materials dispatch call types**.
13. **Implement a reporting mechanism/procedure for technical rescue stand-bys** conducted through the PIER program.
14. **Consider alternative training delivery options,** including the feasibility of a centralized emergency services training center, to limit the *out of service* time or to limit the deviation from the established total reflex time response goals while conducting on-duty training.
15. **Conduct a careful review of response times, resources reliability, call volume, station resource levels and deployment levels** in determining alternatives for improving response times in targeted areas of LF&EMS' jurisdiction.

16. **Initiate measures to improve the interaction between LF&EMS and LynCom**, including additional fire and emergency medical dispatching training and monitoring of performance measures, especially call processing time. **Efforts to reduce the call processing time within the adopted standard need to be initiated.**
17. **Work with surrounding jurisdictions to study the feasibility of automatic aid agreements or contract service areas** to prevent the duplication of services in *overlapping* of station service areas.

When this document recommends changes to a LF&EMS standard, and as a part of the annual evaluation of LF&EMS' Standard of Response Coverage, specific information needs to be reconsidered for each of the recommended performance standards. Such information includes:

- National, state or local standards used to establish goals;
- Applicability of the desired performance standard to LF&EMS, considering its resources and the risk analysis;
- Estimated costs as a result of implementing new goals (for example, if additional staffing is required, the estimated costs of full time employees);
- The desired timeline for improvements or obtaining the performance standard; and
- The method to measure the stated goal and/or performance standard.

LF&EMS recognizes that NFPA 1710 has established a deployment standard with specific response times and staffing for all types of calls. We will continue to measure our performance against these response time goals as well as our own adopted response time goals. However, the level of staffing of fire and other emergency apparatus remains a local decision in order to allow jurisdictions appropriate flexibility to deal with their environment, as long as legal mandates and safety concerns are met. It is the responsibility of the authority having jurisdiction to assess the risk in the service community and to provide the needed resources to control that risk safely and effective.

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